

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A method for labeling synthesis of phosgene, comprising:
 - (a) providing a UV reactor assembly comprising a high pressure reaction chamber and a UV light source, wherein the high pressure reaction chamber ~~having~~ comprising a window facing a concave mirror, a first gas inlet and a second gas inlet,
 - (b) ~~providing a Cl₂ gas to be labeled,~~
 - [(c)](b) introducing a concentrated carbon-isotope monoxide enriched gas-mixture into the reaction chamber of the UV reactor assembly via the first gas inlet,
 - [(d)](c) introducing said Cl₂ gas into the reaction chamber via the second gas inlet to obtain a Cl₂-carbon-isotope monoxide gas mixture,
 - [(e)](d) irradiating the Cl₂-carbon-isotope monoxide gas mixture turning on the with UV light source for an amount of time sufficient to and waiting for a predetermined time while the promote the labeling synthesis-~~occur~~, and
 - [(f)](e) removing the labeled phosgene from the reaction chamber;
wherein the amount of isotopic dilution is minimized.
2. (Cancelled).
3. (Original) A method of claim 1, wherein the carbon-isotope is ¹¹C, ¹³C, or ¹⁴C.
4. (Original) A method of claim 1, wherein the carbon-isotope is ¹¹C.
5. (Original) A method of claim 1, wherein the UV light source is a UV lamp.
6. (Currently amended) A method of claim 1, further comprising stirring wherein the Cl₂-carbon-isotope monoxide gas mixture during the irradiating step of waiting a

~~predetermined time comprises stirring in the reaction chamber to enhance the labeling synthesis.~~

7. (Currently amended) A method of claim [[7]]I, further comprising wherein the step of waiting a predetermined time further comprises adjusting the temperature of the reaction chamber during the irradiating step that the labeling synthesis is enhanced.

8. (Previously presented) A system for labeling synthesis of phosgene, comprising:
- (a) a UV reactor assembly comprising a high pressure reaction chamber and a window,
 - (b) a UV light source facing said window,
 - (c) a concentrated carbon-isotope monoxide gas source;
 - (d) a Cl₂ gas source;
 - (e) a first gas inlet for admitting concentrated carbon-isotope monoxide enriched gas-mixture into the reaction chamber from the concentrated carbon-isotope monoxide gas source; and
 - (f) a second gas inlet for admitting Cl₂ gas from the Cl₂ gas source wherein the high pressure reaction chamber having a window facing the UV light source, a first gas inlet and a second gas inlet in a top and/or bottom surface thereof, wherein the UV light beam enters the window of the reaction chamber.

9. (Original) A system of claim 8, further comprising a concave mirror facing the window of the high pressure reaction chamber, so that the concave mirror can focus the UV light beam from the UV light source.

10. (Original) A system of claim 8, further comprising a motor, a magnet, and a magnetic stirring bar inside the reaction chamber.

11. (Original) A system of claim 8, wherein the window is a sapphire window.

12. (Original) A system of claim 9, further comprising a protective housing and a bench where the reaction chamber, UV lamp and the concave mirror can be mounted.

13-25. (Cancelled).

26. (New) A method for synthesizing carbon-isotope labeled phosgene comprising:
- (a) providing carbon-isotope monoxide and Cl₂ gas into a closed reaction chamber to give a gas mixture; and
 - (b) irradiating said gas mixture with UV-light;
- wherein the amount of Cl₂ gas used is minimized, thus minimizing isotopic dilution from carrier phosgene.
27. (New) The method of claim 26, wherein nearly quantitative decay corrected radiochemical yields of carbon-isotope labeled phosgene is achieved.
28. (New) The method of claim 26, wherein the specific radioactivity of the carbon-isotope labeled phosgene is optimized.